

Reference Architectures SPG Overview and Primer

Standards Process Group

SPG Technical Session

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Wikipedia on Reference Architecture

- A reference architecture provides a proven template solution for an architecture for a particular domain.
- It also provides a common vocabulary with which to discuss implementations, often with the aim to stress commonality.

http://en.wikipedia.org/wiki/Reference_architecture

Wikipedia (2)

- A reference architecture often consists of a list of functions and some indication of their interfaces (or APIs) and interactions with each other and with functions located outside of the scope of the reference architecture
- Reference architectures can be defined at different levels of abstraction

Wikipedia (3)

- A reference architecture provides a template, based on the generalization of a set of successful solutions.

Views

- Reference Architectures often describe a solution-type from multiple viewpoints
 - Views offer richer context and texture
 - Yet still abstract from those views
- Views are representations of various facets of a solution, from a given perspective (or related set of concerns)
 - Examples:
 - User View - What do users see? How do they interact? With what pieces?
 - Operational View – How does this work? Who operates and what controls do they have?
 - Deployment View – What pieces go where? Are there constraints on the deployment of software to hardware?

What is the value of Reference Architectures?

- Communication of success
- Common vocabulary of concepts
- Quick-start (not reinventing the wheel)
 - A bit more than the 80/20 rule
 - Everything is covered
 - Details are not defined

Ingredients of a Reference Architecture: What's in there?

- Element/component types or roles
- Abstract interfaces
 - Sometimes more than abstract
- Fundamental interactions
- Required Standards

Non-Reference Architectures

- Patterns are not Reference Architectures (architecture, business)
 - Example: SOA is an architecture pattern, not a reference architecture
- Technology
 - Example: Web Services
- A solution, or deployed system
 - The specification or documentation of a system is not a reference architecture
 - But, if appropriate, one could be extracted from a solution, enabling more effective reuse or extension
- Reference Architectures can be based on, or incorporate these...

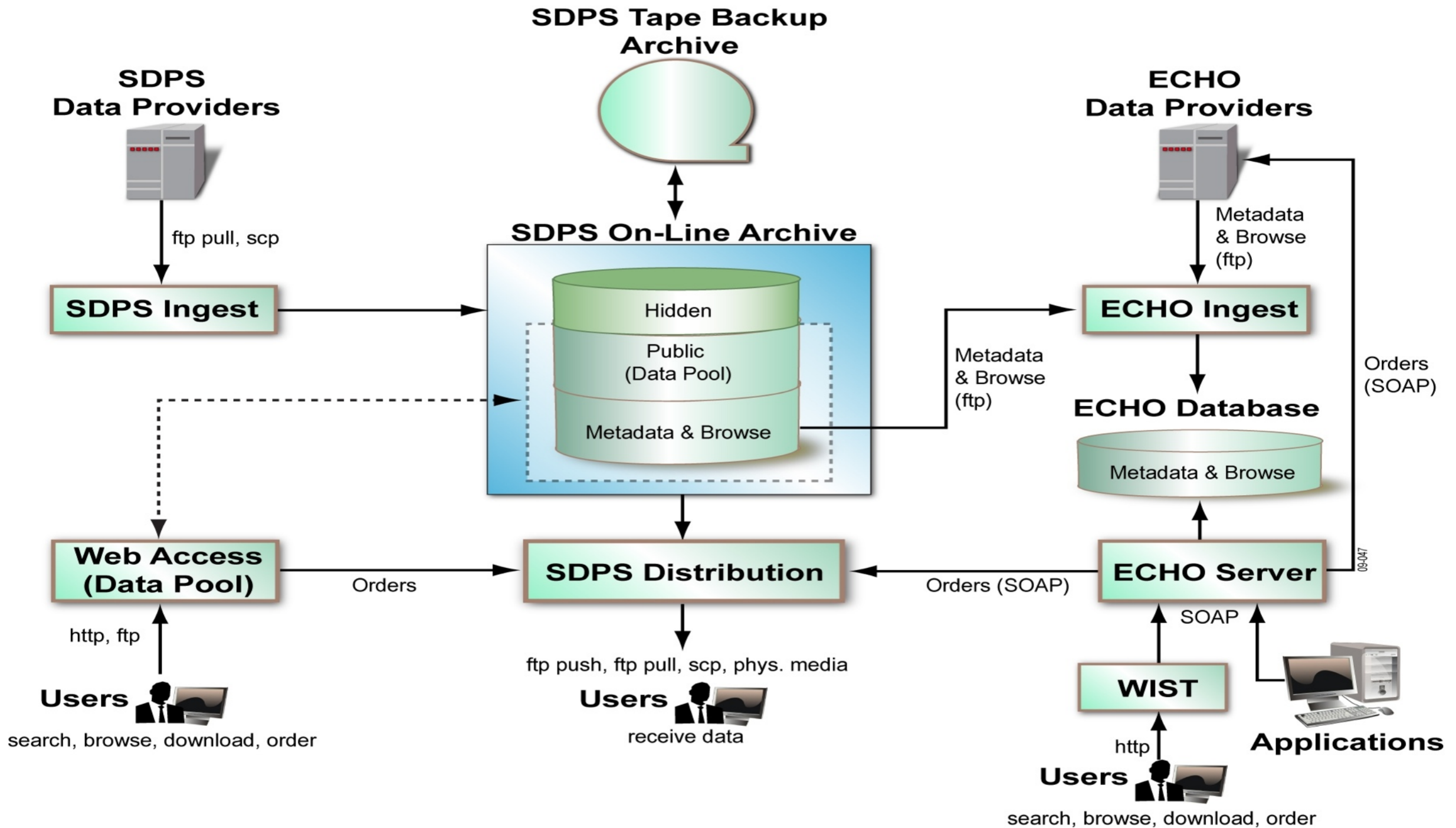
How to Use a Reference Architecture

- Understand it
- Lay your problem on it
- Capture your solution in that “language”

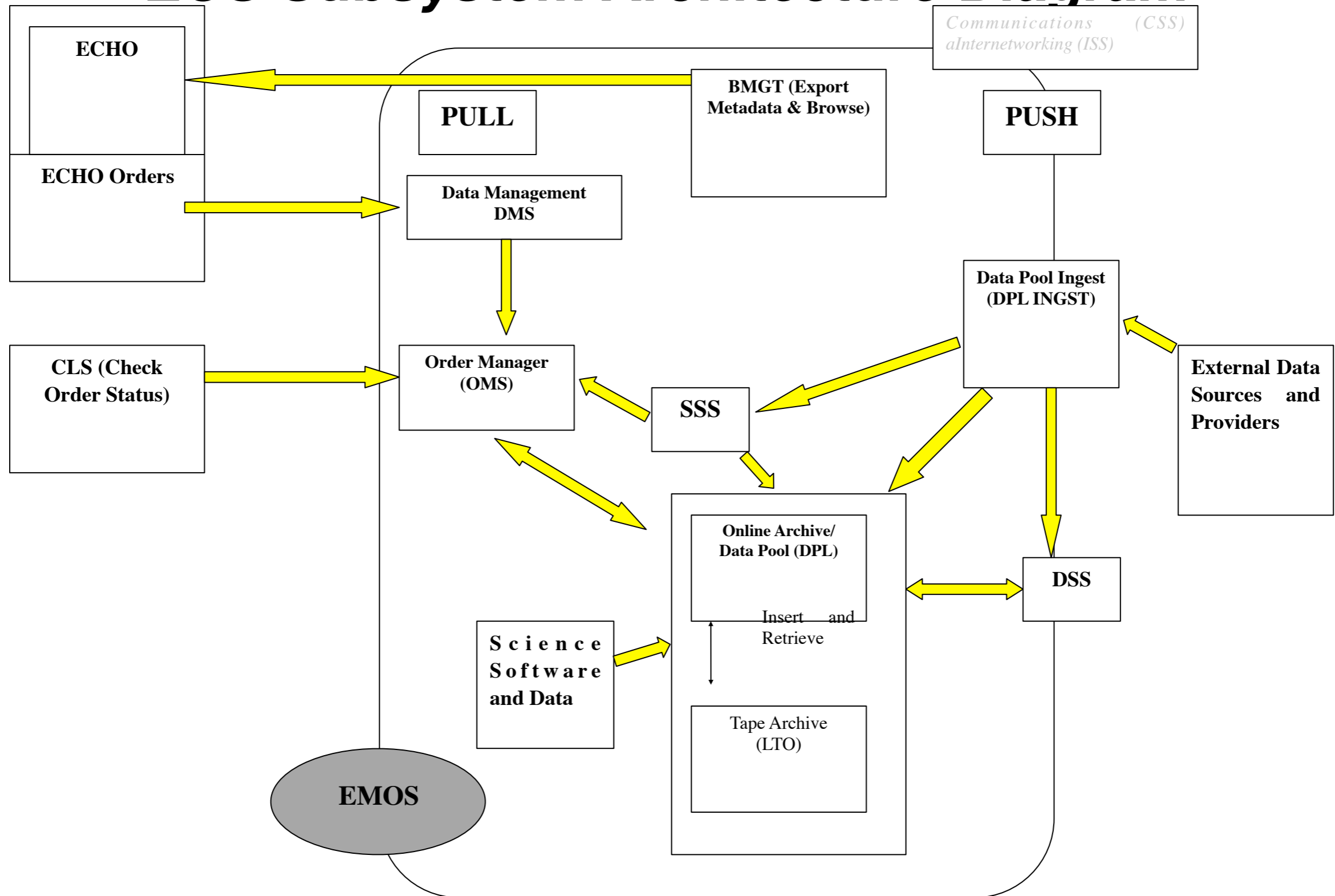
EOSDIS Core



SDPS/ECHO Architecture



ECS Subsystem Architecture Diagram

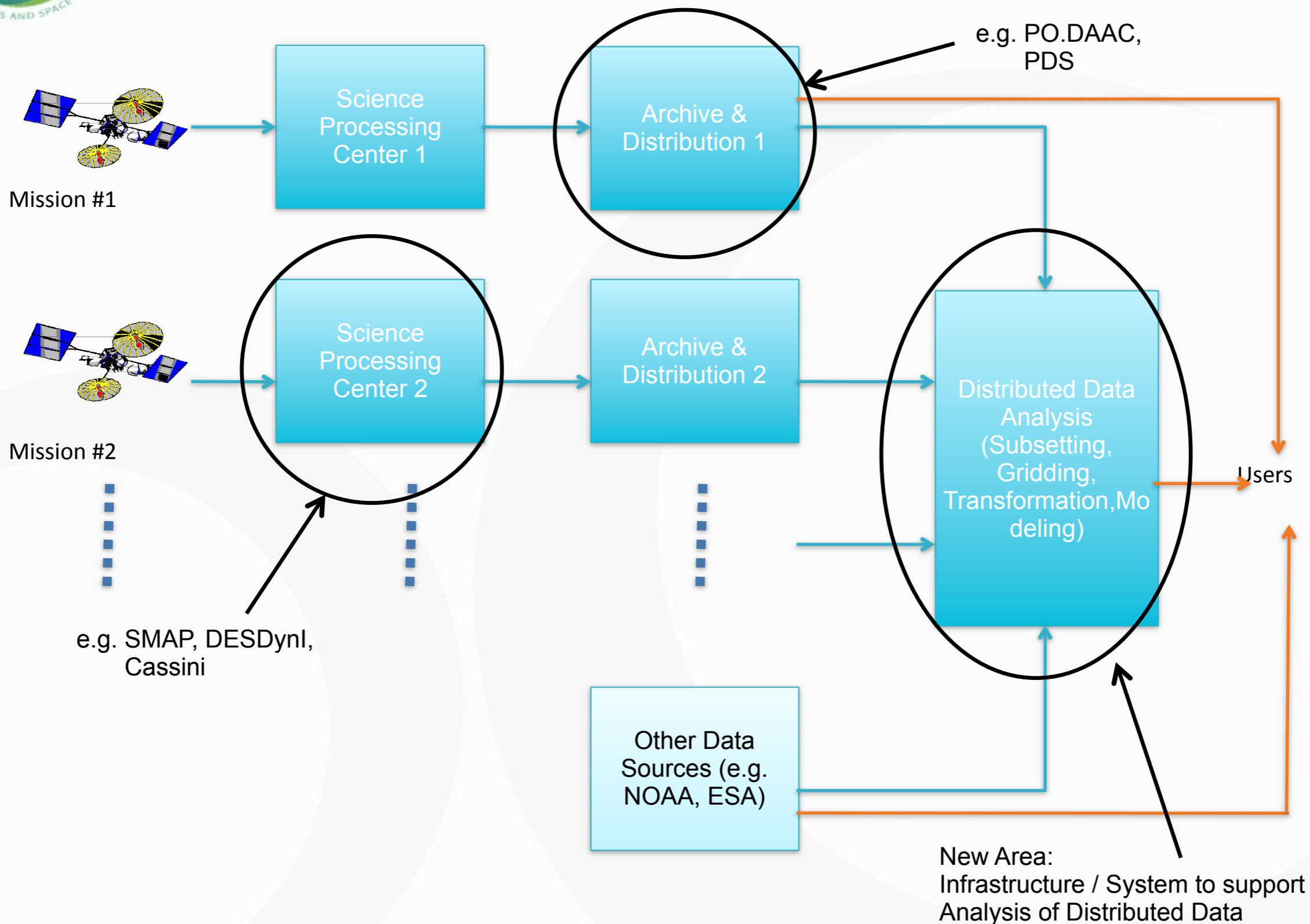


Planetary Data Systems





Mission System End to End View

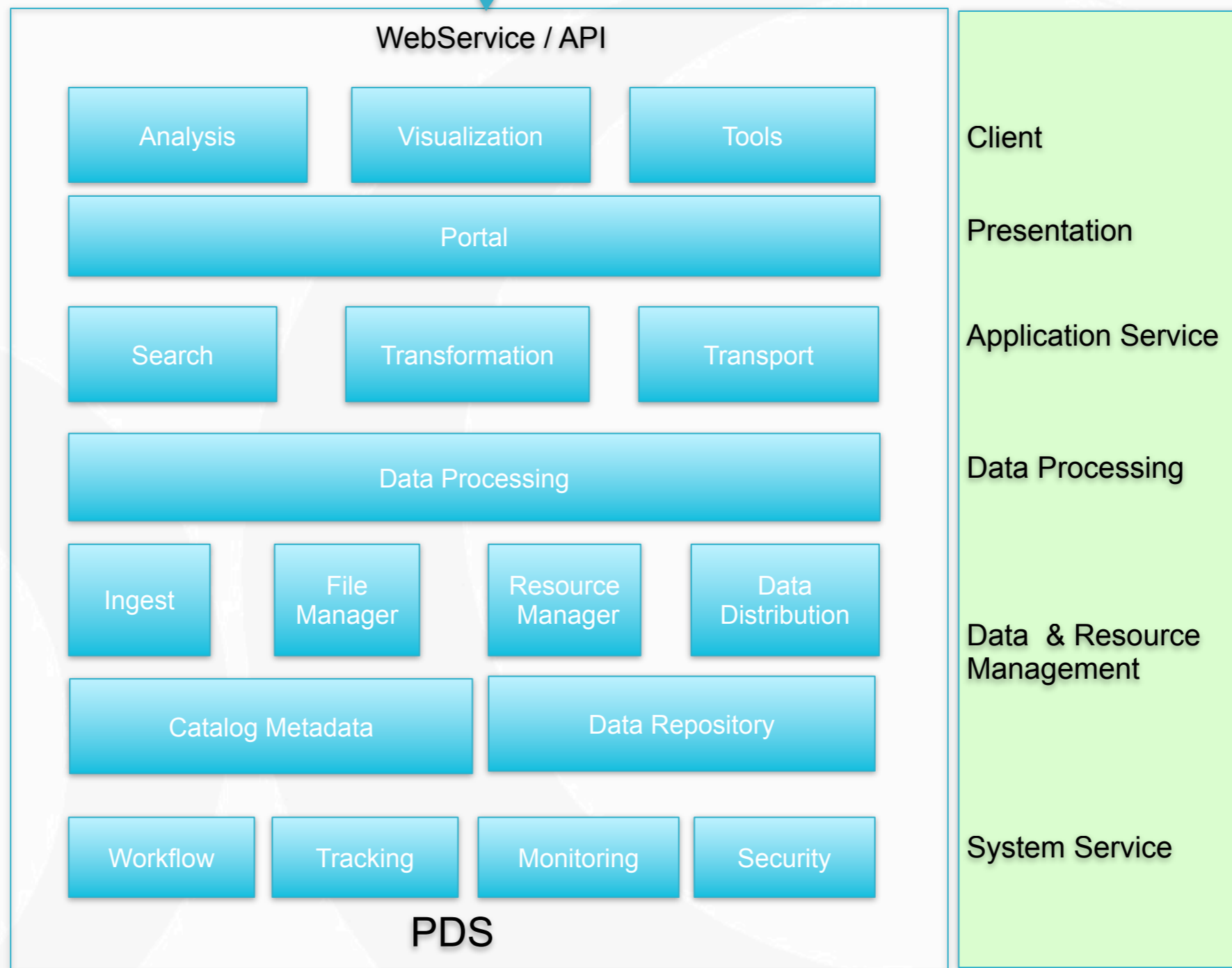
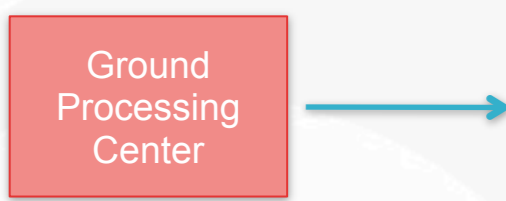
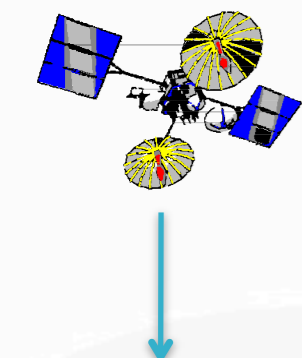
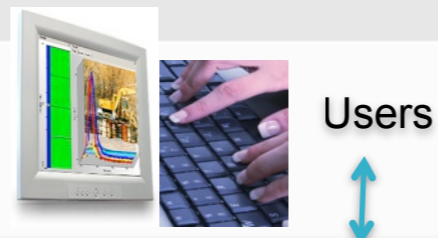


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PDS System Architecture View



- Legends:
- System Layer
 - Data System Component
 - External Entity
 - Interface

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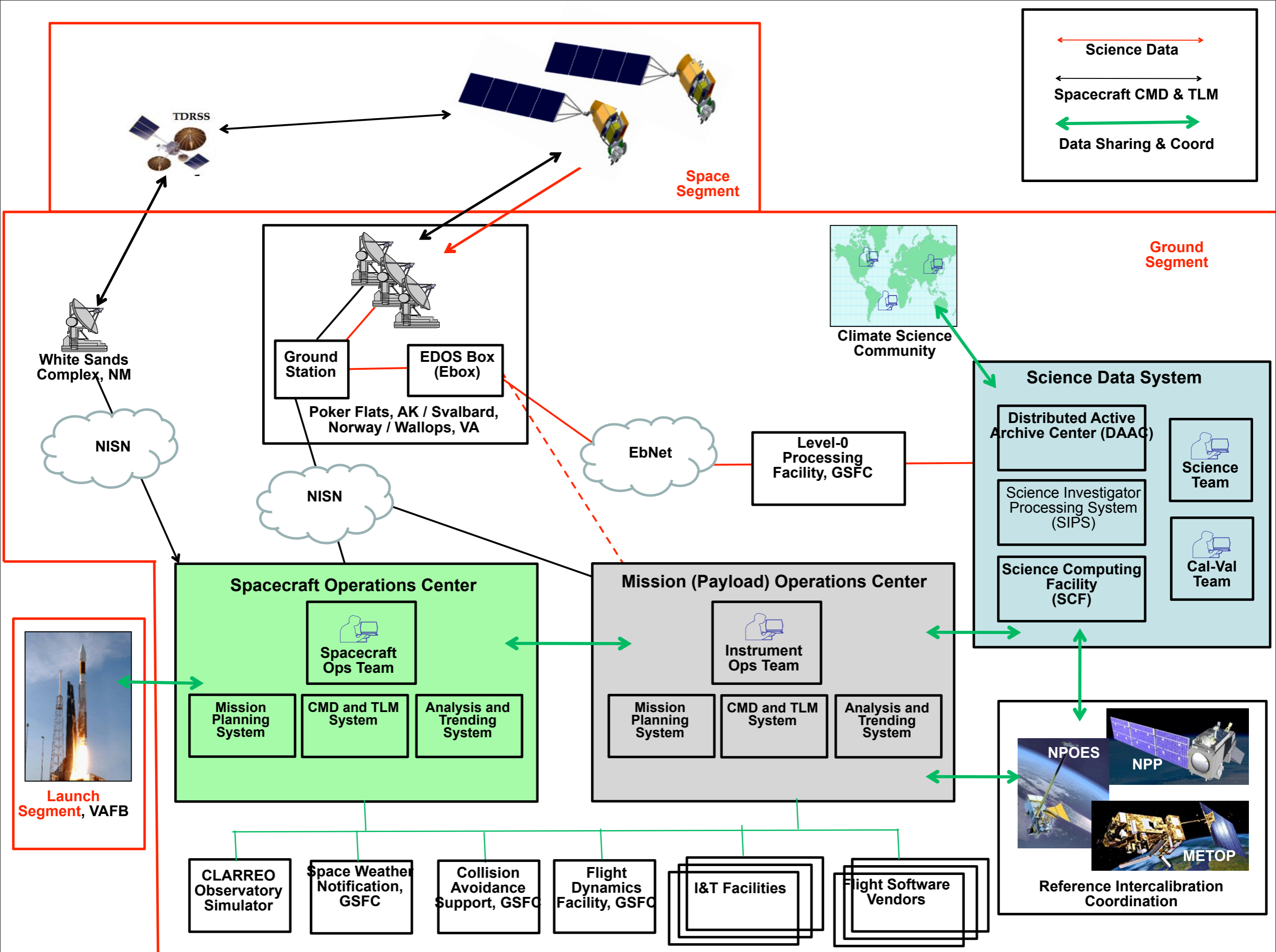


PDS System Standards & Technologies

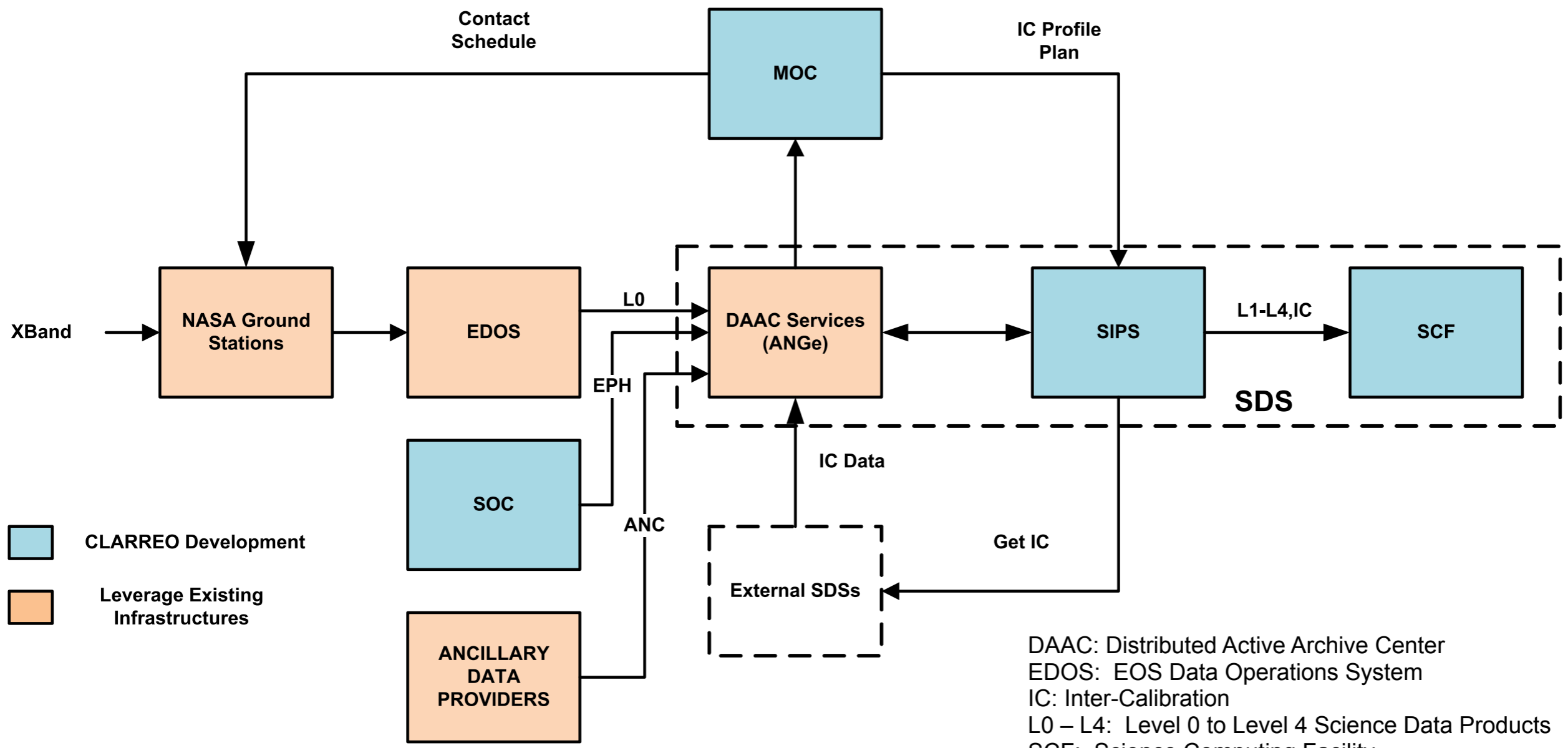
Layer	Standard	Technology
Client	HTTP, FTP, WMS, WFS, WCS	FireFox, Safari, IE, Java, Python
Presentation	HTML, FLEX, HTTP, REST, SOAP, XML	Web 2.0, AJAX, Java Python
Application Service	WMS, WFS, WCS, FTP, WebDAV	Apache (HTTP / Tomcat)
Data Distribution	CCSDS Information Architecture Standards	OODT
Data & Resource Management	TCP/IP, SQL, JDBC	Solr, Lucene, Grid FTP, DBMS
System Service	LDAP	OpenSSO

CLARREO





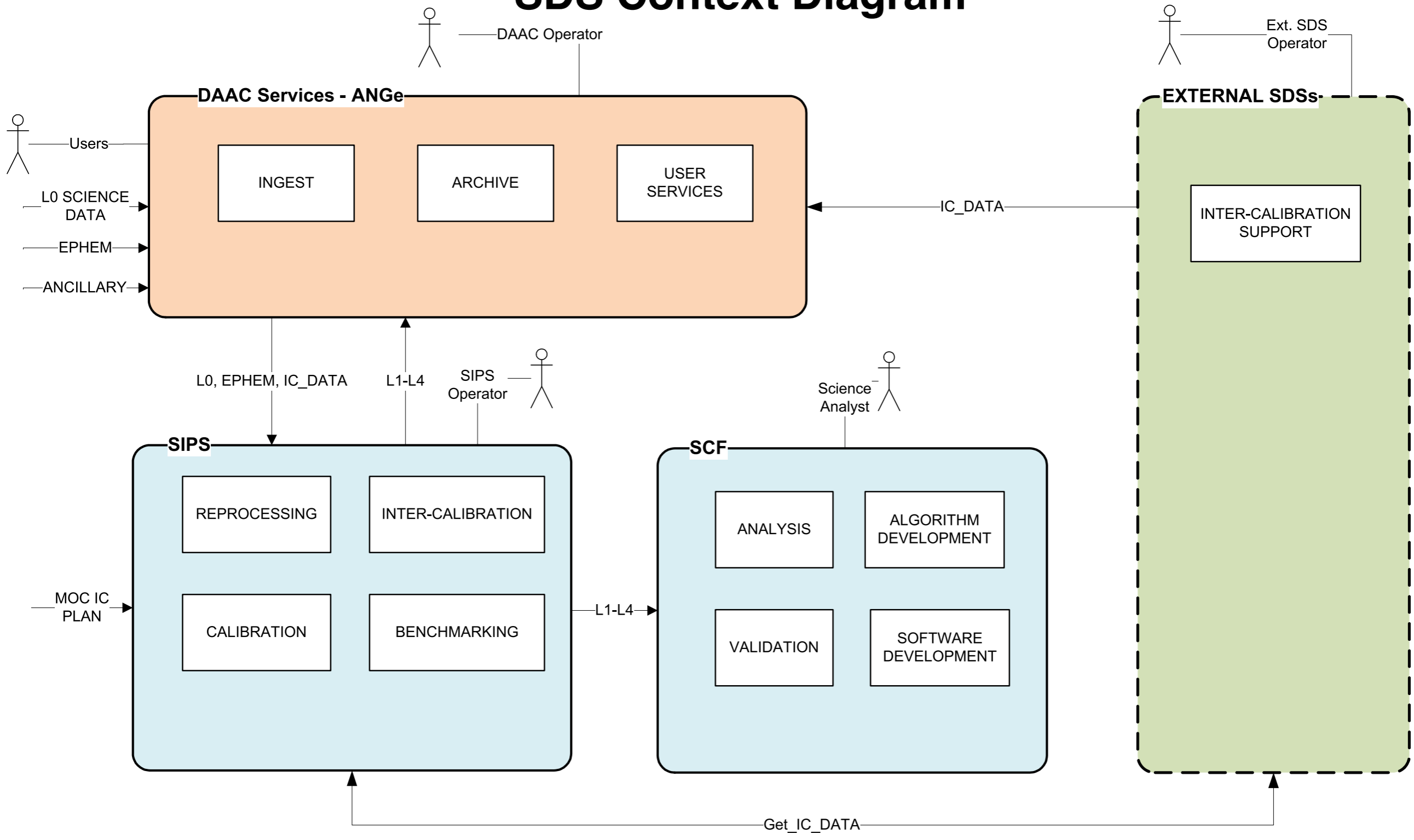
Science Data System Interfaces



CLARREO Development
 Leverage Existing Infrastructures

DAAC: Distributed Active Archive Center
 EDOS: EOS Data Operations System
 IC: Inter-Calibration
 L0 – L4: Level 0 to Level 4 Science Data Products
 SCF: Science Computing Facility
 SIPS: Science Investigator-Led Processing System
 EPH: Ephemeris

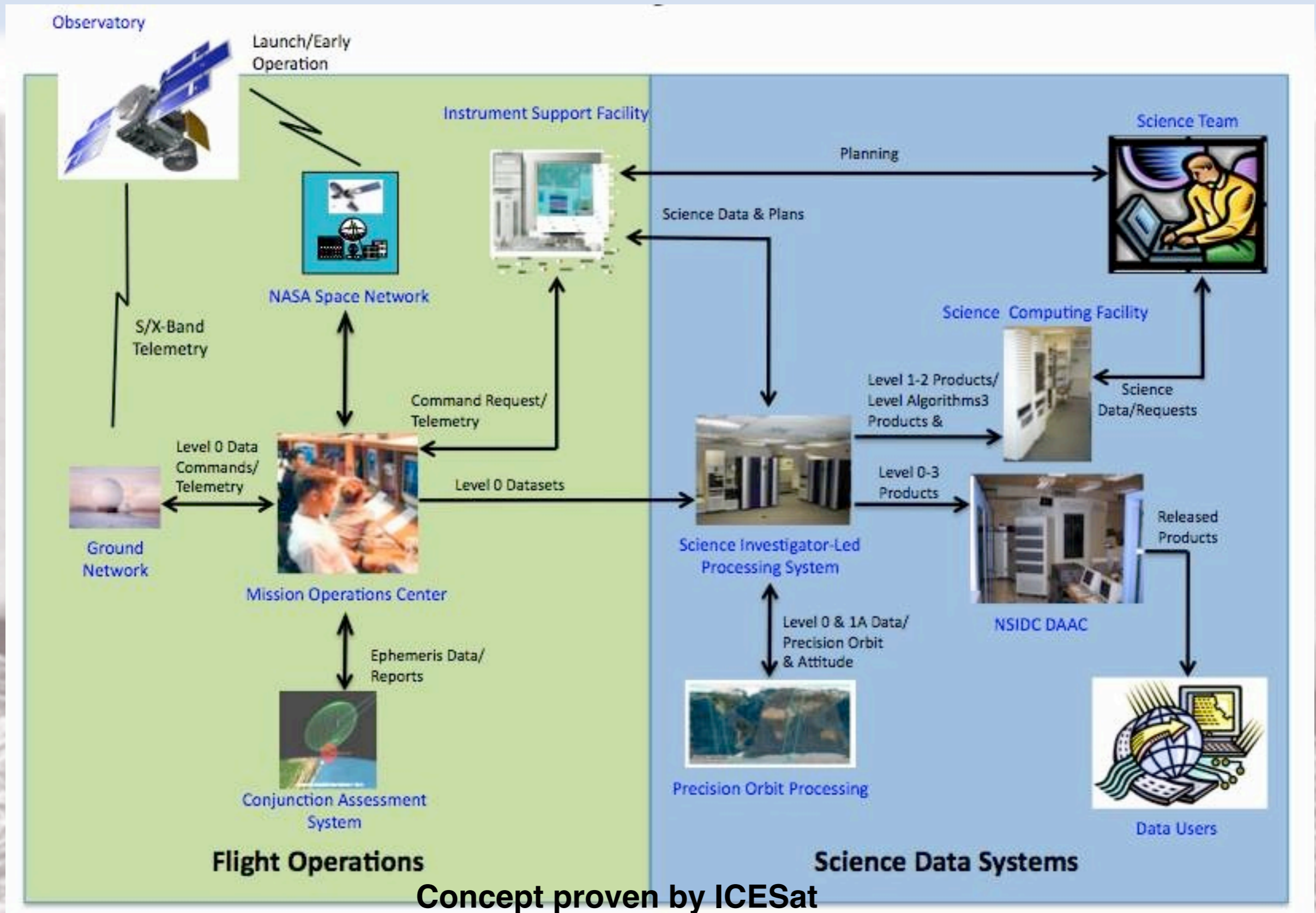
SDS Context Diagram



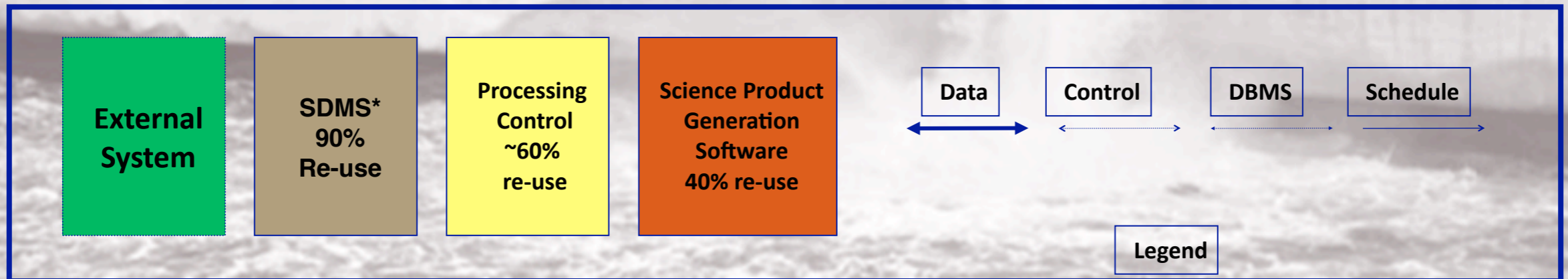
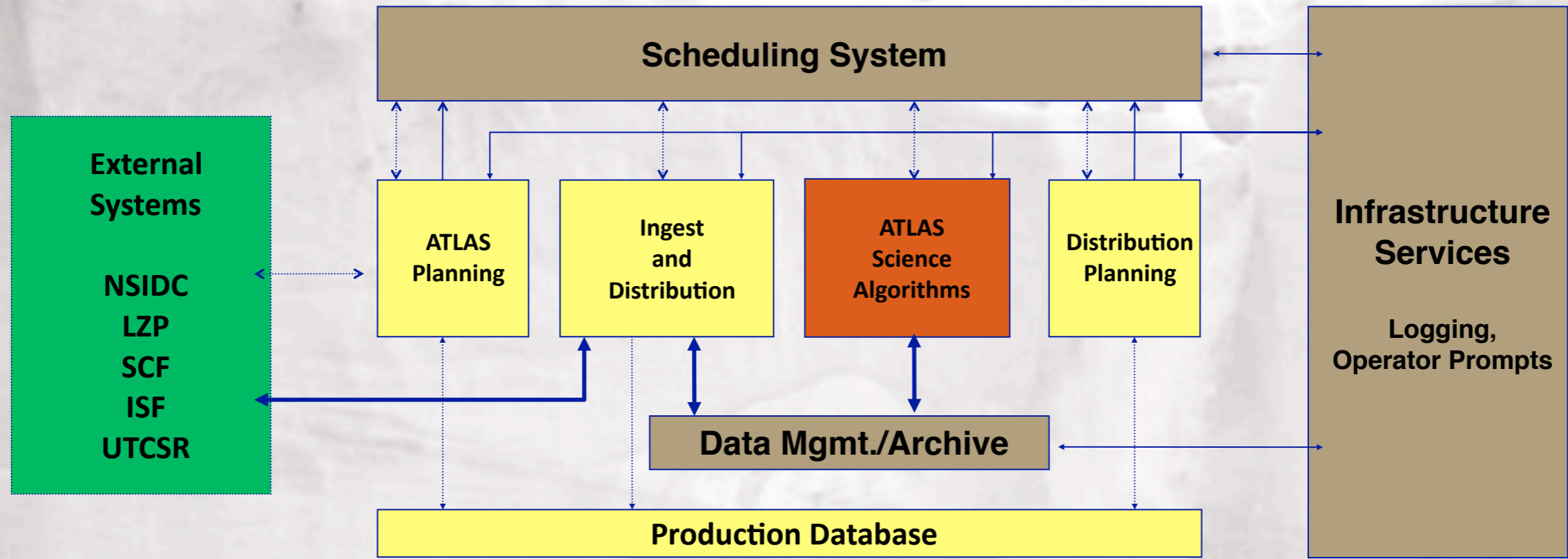
ICESat-2



ICESat-2 Ground System Data Flow



ICESat-2 SIPS Functional Architecture



*High re-use of Scheduling and Data Management System (SDMS) Expected